newTRENDs

POLICY NEEDS BRIEFING

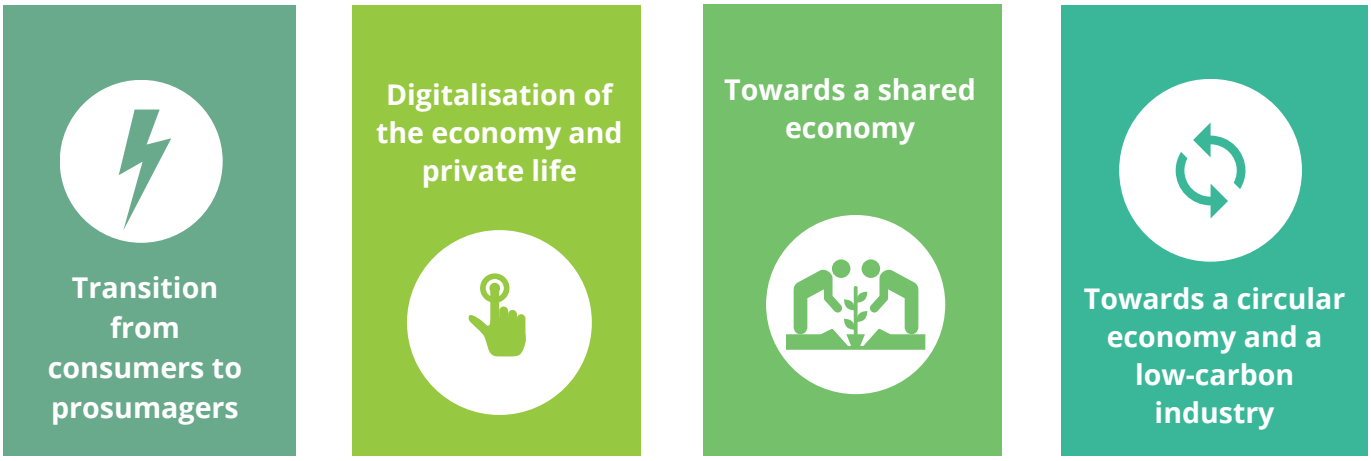
Energy demand-side policy needs at European level

January 2023

The newTRENDs project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 893311.

Context

The four following trends picked by the newTRENDs project are expected to have a significant impact on increasing or reducing energy demand in the European Union in the coming years.



New Societal Trends are understood as societal developments arising from general Megatrends, which can have potentially large (increasing or decreasing) impacts on energy consumption as well as cross-sectoral demand shifts.

These trends may not only affect the amount of energy consumed, but also its preferred form by consumers, or the time period of the greatest burden on the energy grid. The larger the sections of society that succumb to these changes, the greater the evolution will take place throughout the energy system.

To achieve the Paris Agreement goals, two central strategies have to be implemented in all countries:

i) enhancing energy efficiency (EE) and
(ii) decarbonizing remaining energy supply and demand.

Scenarios with different focuses and assumptions have been developed to map this development until 2050. While these scenarios present a major step forward beyond previous modelling approaches by integrating societal trends, much more progress is necessary to enhance the empirical basis for such trends and their representation in models.
In this context, the project newTRENDs is developing the analytical basis for a "2050 Energy Efficiency Vision" taking into account New Societal Trends in energy demand modelling.

This briefing is based on the newTRENDs report "Diagnosis of energy demand-side policy needs at European level" authored by Research and Innovation Centre Pro-Akademia (RIC) and WISE, and providing a diagnosis of energy demand-side policy needs at European level, with a particular focus on effective implementation of the Energy Efficiency First principle.

Policy needs for prosumaging

Transition from consumers to prosumagers

Currently, energy needs shape the behavior of electricity consumers. Electricity is passively demanded and served through energy via the electricity distribution network. By contrast, prosumers may choose to invest in electricity generation and storage units installed on-site, thus locally covering part of their electricity needs but without further changes in their behavioral characteristics.

Equipping the users of electricity that are already prosumers with smart meters transforms them into Active Electricity Consumers, i.e. **Prosumagers** –a term coined within newTRENDs as a new step in the evolution of the electricity consumer.

Within newTRENDs, the effort to identify New Societal Trends regarding prosumaging indicates that improving the existing residential model will allow studying the Impact of prosumaging in greater depth.

Energy Policy Areas

Energy demand models should inform policy making on the 'outputs' of prosumaging activity including :

- **The amounts of overall energy demand, as well as energy generated by self-consumers (energy stored by them, energy self-consumed, and energy introduced to the national power grids).**
- **The amounts of energy sold under time-of-use tariffs.**
- **The amounts of energy generated by individual and collective renewables' self-consumers.**
- **Impacts on grid infrastructure for a broad range of different input assumptions.**

Inform the policy making on the impacts of:

- **Changes in conditions for introduction of permissible charges and fees for renewables self-consumers that are set in RED II, art. 21.**
- **Introducing performance labels & GPP for PV systems on overall energy demand.**
- **Changes in business models of prosumaging.**
- **Introducing an obligation scheme requiring certain share of building energy demand to be covered by Renewable Energy Sources.**
- **Various public support forms for prosumagers on overall energy demand.**

Most pressing policy gaps in prosumaging are:

- Clearer conditions when charges for self-generated electricity remaining within prosumer's premises can be applied by Member States.
- Legal framework for a wide number of consumer types.
- Dynamic electricity pricing.
- Linking subsidies for prosumaging with energy efficiency performance standards of buildings.
- Mandatory implementation of smart features for appliances.

Market Uptake and Consumer Empowerment Policy Areas

Energy demand models should provide insights on:

- The uptake of renewables production installations per category of consumer:
  - social (energy poor and vulnerable, middle class, high class, tenants/owners)
  - economic (residential service and industry sectors)
  - technical (single/multi-family buildings, urban/rural, prosumer/prosumager)
- The uptake of renewables production installations per category of energy community: geographical (rural/urban).
- High granularity of consumer profiles based on: cultural, social, economic, environmental and physical characteristics.

Cross Disciplinary Policy Areas

Lowering energy bills is the primary motivation to starting prosumaging for an average consumer. Differences in the underlying conditions in urban and rural areas can have a substantial impact on the scale of prosumaging activities:

- Rural areas: higher risk of power outages (voltage issues), leading to a potential domino effect of the "discouraged"; higher share of users and owners of cars (EV transport may play an important role in managing energy).
- Urban areas: less space for RES production and storage facilities; mostly driven by ‘district development’.
- Rebound effects of prosumaging activity should be further investigated.
- The existing EU policy framework to stimulate prosumaging does not appear fully sufficient.

Policy needs for digitalisation of economy and private life

Digitalisation of the economy and private life

For digitalisation, this part describes existing and planned EU-level policies which are relevant from the point of view of energy consumption in the tertiary sector in the context of digitalisation. In defining the scope of analysis, we focus on the tertiary sector because it already relies on ICT more than other sectors and is expected to undergo further digital transformation as with the development of new digital technologies and innovations that will further transfer existing services to the digital sphere and lead to the emergence of an array of brand new services relying on such technologies as big data or artificial intelligence.

Energy Policy Areas

Determine how cloud computing will increase energy demand and how it will change energy costs and data transfer costs.

More in-depth modelling of the relationship between digitalisation, network congestion, flexibility and electrification.

Better understanding of the impact of digitalisation and the change in energy demand for investment purposes for the modernization of transmission and distribution networks.

Determine how digitalisation may enable Demand Side Response (DSR) and what impact it will have on energy producers and consumers as well as on electrified transport.

Climate Policy Areas

The challenge of modelling digitalisation is to find the right input data. Modelling today may account for an increase in demand by cloud computing and data servers, but there is no information on the increase in demand by ICT devices.

Need for a better understanding on the impact of ICT devices on the optimisation of energy use and how their use affects on energy costs.

It would be useful to define additional indicators that will allow to determine the greater accuracy and completeness of the models and forecasts.

Policy needs for circular economy

Towards a circular economy and a low-carbon industry

It is expected that circular economy can contribute significantly to the achievement of climate targets of the Paris Agreement while enabling further economic growth.
Circular economy can also reduce the prospective demand for new process technologies and carbon neutral secondary energy carriers. This is relevant for the decarbonization of the energy system considering the limited availability of renewable energy sources (RES) and to reduce overall system costs. This section provides the existing and emerging energy demand side policies and instruments addressing circular economy and low carbon industry in the European Union.

Industrial Growth

From the industrial growth point of view, the energy demand modelling is used for analysis of impacts of given policy instruments implementation. Energy demand modelling is used to run different scenarios and verify how the industry (as a whole) and/or given sectors would react on specific measures. An important component is financial analysis, which shows cost distribution between stakeholders and allows for its optimization.

The major limitation of energy demand models is a low level of disaggregation of their results.

Energy demand models should assist in answering questions on the required amount of investment needed for achieving defined goals, distinguishing private and public sources.

Energy demand models should improve their understanding of the industry ecosystem. Interactions between different sectors and players should be better addressed.

Energy demand models should assist in designing future energy mix and simulating various scenarios. In particular, the role of natural gas and hydrogen (both blue and green) should be included in models.

Uncertainty of models should be better addressed by their authors.

Obtain detailed results per sector, while current models provide more general data.

**How do changes in a given sector impact others, including supply chains?
For example, how does the increase in wood use in the construction sector will impact land use?**

Financial aspects should be better addressed, e.g. cost of implementation of specific policy instruments should be taken into account.

Cross Disciplinary Policy Areas

Since buildings are long-lasting goods, future patterns of building use should be taken into consideration during the design phase, to extend the lifetime of buildings. The shift from non-residential to residential buildings, or change in the functional division of a building should be available to prevent the pre-mature demolition of a building. This should be covered in future legislation changes.

Climate Policy Areas

Energy demand models should allow for variant analysis and answer questions on how assumptions and outputs relate to each other.

Energy demand models should allow for answering a question of what given effect could policies deliver.

Documentations of models should be extended and easily available, to ease understanding of results of analyses, their uncertainty, and limitations.

Just as comparison of different energy models should be available, to better choose proper tools for different analyses.

The interoperability of different models should be improved, to allow transferring data between models.

Energy demand models should allow answering the following questions:

How to improve the impact of existing industrial processes ?

To what extent can a given process be substituted by another one ?

Carbon flows should be better addressed by energy demand models.

Cross-sectoral issues are of major importance and should be better addressed by models.

Energy demand models should allow for obtaining data on the stock overview, e.g. fuel sources and raw materials consumed, imported, and exported in the EU.

It would be useful to analyze what drives circularity in the current policy instruments.

The whole lifecycle of products should be taken into consideration when creating any policy instrument.

Linkages between Directives addressing different life cycle stages are relevant.

Policy needs for a shared economy

Towards a shared economy

This last part describes existing and planned EU-level policies that are relevant from the point of view of energy consumption in the transport sector in the context of the rise of sharing economy.

In defining the scope of sharing economy, we follow the approach adopted by the Commission in the communication "*A European agenda for the collaborative economy*".
Sharing economy is thus understood as "business models where activities are facilitated by collaborative platforms that create an open marketplace for the temporary usage of goods or services often provided by private individuals".

Energy Policy Areas

There is a need to assess the impact of the shared economy and the change in energy demand on the investment need in the modernization of transmission and distribution networks.

There is a need to better understand what will happen to the energy networks as a result of mass electrification of cars, including those used within a shared economy.

Climate Policy Areas

Changes in public awareness could affect the sharing mobility market and demand for energy after the COVID-19 pandemic (reduced trust in public transport, increased use of private cars).

Need to understand structural changes in long-distance vs short and medium-distance road transport competitiveness given the need to decarbonise the sector and its impact on the costs.

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About newTRENDs

The goal of newTRENDs is to recognize and model the influence of new social trends on energy needs demand, and hence develop scenarios of their future development.

New social trends may affect not only the amount of energy consumed, but also its preferred form by consumers, or the time period of the greatest burden on the energy grid. The larger the sections of society that succumb to these changes, the greater the evolution will take place throughout the energy system.

Researchers will use qualitative (foresight) methods with quantitative cross-sectoral modelling. This combination is not widely applied so far and is a great strength of the newTRENDs project. However, the quantitative models that will be enhanced in this project are tools that are quite frequently used by the EU for long-term forecasting. To make the analysis as accurate as possible, researchers will also use modern sources of data on social trends and energy consumption.

Towards a circular economy and a low-carbon industry

Digitalisation of the economy and private life

Transition from consumers to prosumagers

Towards a shared economy

Follow the project!

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